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sibility of change of attention has not been thought possible. The danger of after-image effects was carefully excluded. The hypothesis is further criticized on theoretical as well as on experimental grounds. The general theory advocated by Wundt was that the unequally favorable position of the different parts of the field of view during fixation is rendered less noticeable through the fact that the point of attention moves successively to those letters which are distant from the point of fixation; a 'searching' (*absuchen*), as it were, of the visual field thus occurs at each fixation. Such an hypothesis seems improbable in view of the difficulty which is ordinarily experienced in separating the points of attention and fixation; and the experiments made tend to disprove it.

In the first experiment the attention and fixation are centered together upon a letter lying in the primary line of regard; in the second experiment the attention is separated from the point fixated to a letter lying to the left of it. If a frequent change of attention occurs during the exposure, both letters ought to be equally well perceived in either instance. The results show, however, that in the first case the letters to the left are less often read, and in the second case the percentage of perception of the left letter is twice as great as in the first experiment. One fact may have escaped the writer and at least needs explanation, viz., that the total number of perceptions of *both* letters is larger when the attention is separated from fixation than when they are directed together. It suggests, especially in view of the difficulty which the subjects experienced in maintaining the separation of fixation and attention, the possibility of small eye movements and inaccuracy of fixation, so that the actual points of fixation and attention may have each lain somewhat within the space between the two letters. The only means at the writer's disposal of guarding against this contingency was direct observation of the subject's eyes.

In another experiment red circles were placed about some of the letters, the theory of course being that, if a shifting of the attention occurred, it would center reflexly on these letters. The results were again negative, the color seeming to have somewhat of a disturbing effect. The further observation of the author that the non-domineering letters, such as in the endings *en*, *es* and *er* of words and elsewhere, are sometimes as clearly recognized in the shortest exposures leads to the conclusion that the importance of the domineering letters is simply in the more effective conditioning of the gross word form of which these more prominent letters are capable.

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Cournot et les principes du calcul infinitesimal. HENRI POINCARÉ. *Revue de Metaphysique et de Morale,* May, 1905, pp. 293–306.

This article by Poincaré is one of twelve by as many writers in the present number of the *Revue,* all of which are devoted to an examination of the ideas of A. A. Cournot (1801–1877). These have been strangely neglected, not only by thinkers who have come after him, but by the men of his own time. Mentré, who deals admirably with 'Les racines historique du probabilisme rationnel de Cournot,' explains the silence of Cournot's contemporaries regarding his work as due to his modesty and the slightness of his skill in advertisement, to the circumstances (events of 1848 and 1870) that attended the publication of his works, to the then tyrannical reign of eclecticism, to the exclusively literary culture of his generation, and finally to the common fortune of all misunderstood geniuses, that of being in advance of the thought of their time. Cournot's was a polydynamic mind. His scientific and philosophic interests are strikingly diverse and manifold. History, education, politics, criticism, economics, methodology, statistics, logic, social science, mathematics, all came well within the range of his intellectual activity.

In the article under review Poincaré presents Cournot's mathematical thought in so far as it bears especially upon the character and significance of the calculus. Naturally, in this connection, the focal points and defining lines of the elder savant's philosophy come clearly into view. The so-called two methods of the calculus, that of limits and that of infinitesimals (*infiniment petits*), the Leibnitzian and the Newtonian, which the modern mathematician is disposed to regard as only a difference of notation, seemed to the critics of Cournot's time to differ profoundly. To Cournot himself the two methods appeared to be not merely distinct, but opposite. Each was the exact inverse of the other. How and why? The answer is found in his scheme of thought, in his philosophical tenets, and is near at hand. Cournot was a thoroughgoing realist. There was an external universe quite independent of any thinker. Kant was wrong in regarding space and time as 'merely conditions upon the understanding, as forms inherent in the constitution of the human mind and not in the exterior things which it perceives.' Space and time, however, and other magnitudes are continuous. Natural changes, as growths, expansions, contractions, velocities, accelerations, are continuous. These proceed infinitesimally. The *natural* order is *from* the *infinitesimal* (*infiniment petit*) *to* the *finite.* This *natural* order is also (for Cournot) the *rational* as *opposed* to the *logical,* which latter, unlike the former, depends upon the thinker. The thinker is man, who, because of his infirmity, can not proceed *rationally* but only *logically, i. e., from* the *finite to* the *infiniment petit.* Accordingly the method of limits is logical, but not rational, while that of infinitesimals is rational, but not logical. Both, however, are available for dealing with continuities. Both are rigorous, the former directly, the latter indirectly, *through* the former. And in this connection, it is a fine conceit of Cournot's that, because the natural or rational order is from the infinitesimal to the finite, the derivative $f'(x)$, contrary to Lagrange's usage, should be called the generating or *primitive* function and $f(x)$ the derivative or *derived.* A word of elaboration may be permitted here. Suppose, for example, that $f(x) = \frac{4}{3}\pi x^3$, the volume of a sphere of variable radius x; then $f'(x) = 4\pi x^2$, which is precisely the surface, the *front* (as Professor W. B. Smith has happily called it) *of variation* of the varying volume. If, again, $f(x) = \pi x^2$, the area of an expanding or contracting circle, then $f'(x) = 2\pi x$, which is the circumference, *i. e.,* again the front of variation, the *primitive* variable which by continuous change generates the areal magnitude $f(x)$. The latter is, accordingly, in the sense explained, in conformity with natural (Cournot's rational) process, strictly the derivative of $f'(x)$.

The distinction or opposition between the *rational* and the *logical* is for Cournot, despite their etymological equivalence, fundamental and very significant. Rational order holds of things considered in themselves independently of thoughts or thinkers. Logical order is merely a property of language regarded as instrument of thought. The former consists in, resides in, first principles, simplicities, which are quite independent of their discovery and out of which the complex directly arises. The latter proceeds in the inverse order, by a kind of *reductio ad absurdum,* indirectly from the complex and secondary to the simple and primary. *Raison* is, then, something absolute and would be the same for thinkers of different psychological constitution from that of man. *Cause,* on the other hand, is relative, has a 'double origin, physical and psychological.' Consequently all truths, all verities, be they mathematical theorems or physical phenomena, have their *reason,* but only phenomena have their *cause.*

For Cournot, then, nature is rational and simple. The simple is the reason of the complex. The single Newtonian law is the reason of the Keplerian triplet or complex of laws. In proportion as a formula becomes complicate, *ceteris paribus,* it becomes suspicious. Simplicity and symmetry being thus for Cournot the criterion of certitude, he finds in them 'the secret of the preeminent rôle of mathematics. Mathematics is the science *par excellence,* the most perfect example of scientific form and construction.'

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JOURNALS AND NEW BOOKS

ARCHIV FÜR GESCHICHTE DER PHILOSOPHIE, April, 1905, Band XI., Heft 3. *Paul Tannery, historien der philosophie* (pp. 293–302): F. PICAVET. – His life and works, with special attention to his division of the development of Greek science into four epochs. *Einteilung der griechischen Philosophie* (pp. 303–314): GOEDECKEMEYER. – In the ontological stage we see the divisions of the naïve period and that of the Sophists and methodical philosophers. In the 'eudæmonistic' stage those of Pyrrhonic scepticism with Epicurus and the Stoa, of Carneadean scepticism, with the philosophy of compromise, and of Ænesidemean scepticism with the philosophy of revelation and of positivism. *Zur Geschichte des Briefwechsels zwischen Leibnitz und Malebranche* (pp. 315–321): A BUCHENAU. – A letter from Leibnitz, hitherto omitted from the printed publications of this correspondence, is here given, with comments. *Voltaire als Philosoph* (*Schluss*) (pp. 322–368): P. SAKMANN. – Voltaire would limit the power rather than the goodness of God. In opposing